Space Weather Forecast

Issued on Sunday, 28 August 2022 at 12:24 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate flares (R1-R2) likely 28th, 29th with slight chance Strong flares (R3). G1 Minor Storm likely with CME glance late 28th or early 29th. Chance of further Minor Radiation storms (S1).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was Moderate with several Moderate flares observed from a large sunspot near the southwest limb. A further sunspot group in the in the southeast, whilst less active, has seen some recent growth, with increased magnetic complexity. There are three other sunspot containing active regions, however these are all smaller, simpler and currently stable. No Earth-directed coronal mass ejections were observed occurring in the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind rose from background 350km/s to become slightly elevated with peak 450-500km/s due to arrival of fast winds from a coronal hole. The total interplanetary magnetic field was at moderate levels (10-14nT), but eased to mainly be weak from 27/2030 UTC. The north-south component was variable with some moderate southward pointed field at first, but also eased to weak levels at the same time. Geomagnetic activity was Quiet to Unsettled, with one Active interval (27/1200-1500 UTC)

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) increased as a result of the Moderate-flaring of the large sunspot in the southwest. This led to an S1 Radiation storm occurring through the second half of the 27th, before gradually easing towards background.

Four-Day Space Weather Forecast Summary

Solar Activity: Further Moderate-class flares are likely with a slight chance of a Strong flare. This risk will decrease later in the period as the main sunspot in the southwest rotates off the disc, however the sunspot in the southeast will need to be monitored for any further growth.

Solar Wind / Geomagnetic Activity: A moderately fast CME was generated from a long duration Moderate-flare of the sunspot in the southwest on the 27th. This has the potential to give a glancing arrival 29/0100 UTC +/- 9 hours. Ongoing coronal hole fast wind enhancements are also possible from during day 1 and 2 (28th and 29th), with the elevated solar winds only gradually easing day 4 (31st) onward. Geomagnetic Activity is expected to be Quiet to Unsettle at first, with a chance of Active, and with G1/Minor Storms likely with a chance of G2/Moderate storms from any CME glance. Mainly Quiet geomagnetic conditions expected by day 4 (31st)

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is currently below the S1 Minor Radiation Storm level and gradually declining, but likely to stay above background for much of the period. There remains a chance of further increases to or above the S1 level, due to any notable flares from the large sunspot located in the far southwest of the visible disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	60	10	1
Strong	G3	No	5	15	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	75	60	30	30
Very Active	R3 to R5 X	No	20	15	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	25	25	20	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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